

**NONRESONANT MICROMACHINED GYROSCOPES  
WITH STRUCTURAL MODE-DECOUPLING**

**Abstract of the Disclosure**

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A four-degrees-of-freedom (DOF) nonresonant micromachined gyroscope utilizes a dynamical amplification both in the 2-DOF drive-direction oscillator and the 2-DOF sense-direction oscillator, which are structurally decoupled, to achieve large oscillation amplitudes without resonance. The overall 4-DOF dynamical system is comprised of  
10 three proof masses. The second and third masses form the 2-DOF sense-direction oscillator. The first mass and the combination of the second and third masses form the 2-DOF drive-direction oscillator. The frequency responses of the drive and sense-mode oscillators have two resonant peaks and a flat region between the peaks. The device is nominally operated in the flat regions of the response curves belonging to the drive and  
15 sense-mode oscillators, where the gain is less sensitive to frequency fluctuations. This is achieved by designing the drive and sense anti-resonance frequencies to match.